AMENDMENTS TO THE SPECIFICATION

Please amend the specification as set forth hereinbelow.

Please amend the paragraph beginning on page 3 line 22:

a1

The capabilities of a spectral filtering device can be utilized in multiple ways in communications systems, including signal coding and decoding for Code-Division Multiplexing (CDM), optical packet recognition, code-based contention resolution, as WDM multiplexers and demultiplexers, and as WDM add/drop multiplexers. Figure 2 depicts the encoding and decoding of optical signals in a CDM context. Data 202 is input through a first communication channel, and data 206 is input through a second communication channel. Data 202 passes through a spectral filter 204, which encodes data 202 with an identifying code. Similarly, data 206 is encoded with an identifying code by a spectral filter 208. The encoded signals are combined and transmitted over an optical transmission line 210. At their destination the encoded signals are split into two paths, 212 and 214. The upper path 212 feeds into a spectral filter 216, which imparts a transfer function that is the conjugate transfer function of the filter 204. The output of spectral filter 216 is a signal comprising the superposition of data 202 and data 206; however, due to the encoding imparted by spectral filters 204 and 208 and subsequent decoding by spectral filter 216, this output signal contains a component 218 originating from 202 that has a specific recognizable temporal waveform, typically comprising a brief high power peak for each bit transmitted, along with a component 220 originating from data 206. In the upper path, the component originating from data 206 has a temporal waveform structure that can be discriminated against in detection. Typically, ~~data 206~~ <u>component 220</u> has no brief high power peak.

Please amend the paragraph beginning on page 15 line 17:

In Figure 11, a planar-programmed holographic device 1100 with a different configuration is shown. In this configuration there are two inputs 1102, 1104, and three outputs 1106, 1108, 1110. The transfer function of the programmed holographic structure ~~1012~~ 1112 can be designed so that signals from the inputs 1102 and 1104 are directed at one or more of the outputs 1106, 1108, 1110, with each port-to-port connection having an individual spectral/temporal transfer function that may be the same or different than the others. Individual port-to-port connections are controlled by primitive programmed holographic structures.

Please amend the paragraph beginning on page 18 line 8:

The wavefronts of the simulated input and output functions can be modified from the forms specified above to provide more efficient coupling of input signals to the output port employed. Let $E_{ir}(\mathbf{r})$, $E_{outr}(\mathbf{r})$, $E_{si}(\mathbf{r})$, and $E_{sout}(\mathbf{r})$ be, respectively, the spatial wave generated by the input port, the spatial wave optimally matched to the output port, the spatial wave used as the simulated input, and the spatial wave used as the simulated output. The parameter **r** represents the vector position within the holographic substrate. $E_{ir}(\mathbf{r})$ and $E_{outr}(\mathbf{r})$ are fixed by the port characteristics and the waveguide or medium to which they couple. The functions $E_{si}(\mathbf{r})$ and $E_{sout}(\mathbf{r})$ are preferably chosen so that the following equation is satisfied:

$$\cancel{E_{sout}(\mathbf{r}) = E_{ir}(\mathbf{r})\bullet E_{si}^{*}(\mathbf{r})\bullet E_{sout}(\mathbf{r}).}$$

$$\underline{E_{outr}(\mathbf{r}) = E_{ir}(\mathbf{r})\bullet E_{si}^{*}(\mathbf{r})\bullet E_{sout}(\mathbf{r}).}$$